

REMARKS

STATUS OF CLAIMS

In response to the Office Action dated April 3, 2008, claims 1, 6 and 8 have been amended. Claims 1-6 and 8 are now pending in this application. No new matter has been added.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 103

I. Claims 1, 3-6 and 8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hill et al. (U.S. Patent No. 6,243,070) in view of Koyama et al. (U.S. Patent No. 6,542,161).

The Examiner admits that Hill does not disclose to determine the luminance level of the first pixel based on the changed arrangement pattern using a stored table indicating a predetermined correspondence between arrangement patterns of sub-pixels and luminance levels of sub-pixels arranged in a certain direction, and the correspondence indicated by the stored table is determined using a predetermined correction pattern of color element levels of sub-pixels neighboring a sub-pixel corresponding to the basic portion. Koyama has been relied upon by the Examiner as disclosing such feature and the Examiner maintains that it would have been obvious to a person of ordinary skill in the art to combine the references to meet the terms of the claims because by using a stored brightness table, as taught by Koyama, the color element level of each sub-pixel can easily be converted to a brightness level.

It should be noted that Koyama et al. (U.S. Patent No. 6,542,161) corresponds to EP 1,026,659 A2, published August 9, 2000. Koyama et al. with hereinafter be identified with reference to EP 1,026,659 A2.

To expedite prosecution, independent claim 1 has been amended to delineate, *inter alia*:

...
a first pixel of the plurality of pixels comprises a plurality of first sub-

pixels;

at least one pixel neighboring the first pixel comprises a plurality of second sub-pixels;

the control section determines all arrangement pattern containing a plurality of elements, wherein a value of each of the plurality of elements is determined depending on whether or not the basic portion is assigned to a corresponding sub-pixel of the plurality of the first sub-pixels and the plurality of the second sub-pixels; and

the control section introduces a predetermined change into the arrangement pattern, the predetermined change including one of replacement of a position of the basic portions and duplication of the basic portion, and determines a luminance level of only the first pixel based on the changed arrangement pattern.

Independent claims 6 and 8 have been amended to recited similar subject matter.

The present invention relates to a character display apparatus and method capable of displaying characters with a high resolution but simplified correction process, the process of which can be performed at practical speed and can reduce the required working memory during processing (see page 14, lines 11-19).

In particular, with reference to Figures 1 and 3-7, a pixel table 5e containing a correspondence between the arrangement pattern of a basic portion comprising $M+2*N$ sub-pixels and the luminance levels (pixel value) of the M sub-pixels is used to determine the luminance level of the pixel of interest. M represents the number of sub-pixels contained in the pixel of interest whose luminance level is to be determined and N represents the number of sub-pixels neighboring each side of the M sub-pixels (see page 32, lines 4-10; and page 40, line 3 to page 54, line 2).

For example, assume that the arrangement pattern of sub-pixels corresponding to a basic portion is "x10 000 01x". When the correspondence indicated by the pixel value table 5e has been determined using the correction pattern 1 shown in Figure 10, the arrangement of the color element levels is "x75, 212, 57x". Only the color element levels (2, 1, 2) of sub-pixels

contained in the pixel of interest are later converted to luminance levels (182, 219, 182) (see page 42, lines 3-20).

As such, it clearly shows that only the luminance levels of the pixel of interest are determined, and the determination is based on an arrangement pattern depending on whether or not the basic portion is assigned to the sub-pixels of the pixel of interest (here it is the pixel in the middle) and the sub-pixels contained in the pixels neighboring such pixel of interest.

As such, processes are simplified as compared to a conventional technique in which the color element level of a sub-pixel corresponding to a basic portion and the color element levels of sub-pixels neighboring that sub-pixel are determined before the color element levels are used to determine the color luminance level of a pixel of interest. Advantageously, the present invention will reduce the size of the memory apparatus, reduce a working memory region and thereby reduce the cost (see page 22, line 11 to page 23, line 9).

Moreover, the arrangement pattern is subjected to changes like replacement of the sub-pixel position corresponding to the basic portion to avoid deformed character, or duplication of a sub-pixel corresponding to a basic portion to thicken the line width of a character. However, due to the use of the above described arrangement pattern, both processes are simplified (page 23, line 11 to page 24, line 20).

Hill et al., quite differently, aims to reduce color artifacts in images by adjusting the luminous intensity values to reduce the difference of adjacent red and green pixel sub-components where pixel sub-components are separately controllable (see Abstract of Hill et al.).

In particular, Hill et al. clearly fails to disclose or suggest a "control section determines an arrangement pattern containing a plurality of elements, wherein a value of each of the plurality of elements is determined depending on whether or not the basic portion is assigned to a

corresponding sub-pixel of the plurality of the first sub-pixels and the plurality of the second sub-pixels; and the control section introduces a predetermined change into the arrangement pattern, the predetermined change including one of replacement of a position of the basic portions and duplication of the basic portion, and determines a luminance, level of *only* the first pixel based on the changed arrangement pattern”, as now recited in amended independent claim 1. Similar subject matter is recited in amended independent claims 6 and 8.

The Examiner appears to treat the claimed first sub-pixels and second sub-pixels with no difference. For example, with reference to Figure 7A of Hill et al., the Examiner refers generally to a pixel with a plurality of sub-pixels and a neighboring pixel as the first and the second pixel. Thereafter, with respect to the arrangement pattern, the Examiner explains that Hill et al. teaches that white is used to indicate pixel sub-components which are turned on, and pixel sub-components which are not white are turned off (see page 4, lines 6-10 of the Final Office Action).

However, such description does not correspond to the claimed “arrangement pattern containing a plurality of elements which are associated with the luminance level of the first pixel (the pixel of interest) where the value of each element is determined *depending on whether or not the basic portion is assigned to one of the first sub-pixels and the second sub-pixels*” (emphasis added), as explained above.

Moreover, there does not appear to be any description in Hill et al. suggesting a determination of luminance of the pixel of interest is subject to the influence of the pixel neighboring the pixel of interest.

According to Hill et al., if it is determined, for example, 50% or more of the scaled image segment is occupied by the image to be displayed, the corresponding pixel sub-component would

be simply turned on (see column 16, lines 20-55 of Hill et al.), or alternatively, the corresponding pixel sub-component would be assigned an intensity value of 128 if gray scale techniques are applied (see column 18, lines 25-32 of Hill et al.). It is specifically disclosed in Hill et al. that “in accordance with the present invention, the neighboring pixel sub-component of the same pixel would then have its intensity value independently determined as a function of another portion” (see column 18, lines 33- 36 of Hill et al.). Even if weighted scan conversion operation is applied, it is only adjusted such that for example, “60% of the scaled image area that is mapped into a pixel is used to determine the luminous intensity of the green pixel sub-component...” (see column 17, lines 36-46 of Hill et al.).

In any event, Hill et al. fails to disclose or suggest “the control section determines an arrangement pattern containing a plurality of elements, wherein a value of each of the plurality of elements is determined depending on whether or not the basic portion is assigned to a corresponding sub-pixel of the plurality of the first sub-pixels and the plurality of the second sub-pixels; and subsequently fails to teach or suggest “the control section introduces a predetermined change into the arrangement pattern, the predetermined change including one of replacement of a position of the basic portions and duplication of the basic portion, and determines a luminance level of *only* the first pixel based on the changed arrangement pattern”, as now recited in amended independent claim 1 (and amended independent claims 6 and 8).

Koyama et al. does not remedy the above-noted deficiencies of Hill et al. Rather, Koyama et al. appears to disclose a typical conventional technique, as discussed in the present application (see Figure 15A, 29A and 29C of Koyama et al. (EP 1,026,659 A2), which are similar to the conventional techniques illustrated in Figures 12 and 14 of the present invention; see particularly, 52008 and 52009, 53008 and 53009 of Koyama et al. (EP 1,026,659 A2).

As such, Hill et al. clearly fails to disclose or suggest a display apparatus, as now recited in amended independent claim 1 (and amended independent claims 6 and 8) and Koyama et al. fails to remedy the deficiencies of Hill et al. with respect to amended independent claim 1 (and amended independent claims 6 and 8).

In view of the above, claims 1, 3-6 and 8, as amended, are patentable over Hill et al. and Koyama et al. (EP 1,026,659 A2).

II. Claim 2 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hill et al. in view of Koyama et al., and further in view of Desai (U.S. Patent No. 6,282,328).

Desai does not remedy the above-noted deficiencies of Hill et al. and Koyama et al. with respect to amended independent claim 1 and claim 2 depends directly from amended independent claim 1. Therefore, claim 2 is patentable over Hill et al., Koyama et al. (EP 1,026,659 A2) and Desai,

III. In view of the above, the allowance of claims 1-6 and 8, as amended, is respectfully solicited.

CONCLUSION

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

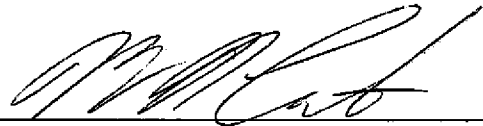
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Edward J. Wise Reg. No. 34,523 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§ 1.16 or 1.14; particularly, extension of time fees.

Date: July 3, 2008

Respectfully submitted,

By



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